DOCUMENT RESUME

ED 312 228 SP 031 525

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TITLE Mastery Check vs. Traditional Homework Assignment. Which Works Best?
PUB DATE 28 Jul 89
NOTE 16p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; Assignments; *Evaluation Criteria; *Evaluation Methods; Grade 10; Grade 11; High Schools; *Homework

ABSTRACT

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ED312228

# MASTERY CHECK vs. TRADITIONAL HOMEWORK ASSIGNMENT
# WHICH WORKS BEST?

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July 28, 1989

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**Abstract**

This investigation was performed to determine if different methods of evaluating homework would produce a noticeable difference in unit test performance. Two different high school math classes were given a traditional homework assignment for a six weeks period and then were given a five question mastery check the next six weeks period. The average test scores were then compared using a standard t-test with one dependent variable. Although the test scores during the mastery check period were higher than the other test scores, the findings were not statistically significant.

Introduction:

In recent years great change has been seen in teaching especially in public education. Teaching, which was once considered to be an art form practiced by "born teachers" is now being studied as a science which has definable characteristics that can be developed and improved. Teaching a subject such as mathematics or English has now been broken down into special topics such as Algebra and Literature and these topics have been further specified as objectives. Generic terms such as "assignment and homework" are defined in terms of "mastery of objectives", criterion performances, and behavioral outcomes.

This emphasis on the nature of teaching presents a very real question for evaluation. What will be the criterion for determining if a student has satisfactorily mastered an objective? Does the standard method of grading an assignment on a scale of 0 to 100% accurately reflect mastery of an objective or should the criterion be that a student correctly respond to 4 out of 5 questions based upon a specific behavioral outcome? This latter proposal is referred to as a check for mastery or simply a mastery check. According to Popham, if we desire to measure the level of mastery of an objective we should interpret test performance "in relationship to a well-described behavioral domain" (Popham, 1981). In reality, both of

these suggestions have merit and are needed to accomplish the full range of purposes necessary in educational measurement (Popham, 1978). A revealing and profitable question might be, how do students perform when different methods of evaluation are used in delivering instruction? More specifically, do students achieve higher unit test grades when daily work is based upon a five question mastery check as opposed to a traditional assignment. For this study a "traditional assignment" is defined as a set of problems to be completed either in class or at home where students are allowed and expected to help each other.

Problem Statement and Research Hypothesis:

This study was conducted to compare two common methods of assigning grade credit for student performances during the learner performance stage of an instructional strategy. A basic problem statement is:

> to study the influence of different types of homework or class-work exercises, specifically, to see if there would be a noticeable difference in the unit test performance when
>
> 1. students are given a mastery check consisting of five problems
>
> as opposed to
>
> 2. students that are given a traditional in-class assignment of 10 to 25 problems.

Sample Set:

The sample set used in this investigation was one composed of two groups: a 10th grade class containing ten students and an 11th grade class containing ten students. All of these students attended IOLA High School during the 1988-89 school year. This school is located in IOLA, Texas in Brazos County and is part of the IOLA Independent School District. Below-level classes in IISD are part of a two level system, below-level being the track for students that have failed a course or have not chosen to attempt the on-level track. On-level students are those students that are taking college-preparatory classes. It should be noted that IOLA offers an "advanced diploma" to students that take a prescribed variety of courses that serves as a quasi third level. The 10th grade class had six male students and four female students while the 11th grade class had five male students and three female students.

Description of Treatment:

The dependent variable used to determine whether students learned more from the five-question mastery check than an average length assignment was the cumulative test average of the two groups. The five-question mastery check was made up of problems designed to test a student's mastery of the lesson's stated learning objective. The traditional assignment problems were based upon the same learning objectives but provided a wider range of problems and additional drill and practice on these problems. Because of the nature of the two methods of assessing a student's attainment of an objective, it should be noted that there is an immense difference in the ambiguity and risk (Doyle, 1986) of these two methods. These issues provide the key distinctions between the two treatments. The mastery check method has a high level of risk due to the fact that each of the five problems will carry a grade-heavy weight but low ambiguity. Conversely, the traditional assignment method has a much lower level of risk because each problem attempted carries only a small fraction of the total grade weight but the ambiguity is greater because the association of the problems to particular objectives is less distinct. On a daily assignment using the mastery check method, five problems are given at the end of an instructional period. Then a student

was either assigned or denied credit based upon the measure of correctly answering four out of five questions on a criterion referenced test. Under these conditions the student's perceived risk is high. On a daily assignment using the traditional assignment method, approximately 20 problems are given at the end of an instructional period. This implies that each problem would count as 5% of the total assignment grade, thus lowering the risk for this method.

Procedure and Design:

It was noted that the events of instruction (Gagne, 1977) were held constant across both groups allowing both groups equal instructional opportunity. Another point of concern that was monitored carefully was the place where the treatment assessment was conducted. Ample time was set aside for students to exhibit performance of an exercise and be given corrective feedback before the actual assessment of learner progress was done. Provisions for this corrective loop were made by using class examples, board-work by the students, seat-work and verbal response during class discussions. Finally, one marked difference between the two methods of evaluation was the amount of group discussion allowed during the actual treatment time. During the mastery check evaluation of five problems at the end of the class period, all work was independent. Conversely, the traditional assignment allowed and encouraged student discussion of assigned problems. Each class (10th grade and 11th grade) experienced both treatments. The order of occurrence of the treatments were the traditional assignment treatment and then the five question mastery treatment. Each treatment was conducted for a six weeks period. In the investigation, cumulative test averages served as the dependent variable.

Some problems were encountered in actually applying these treatments under the outlined specifications. First, students working on the five-question mastery check treatment had difficulty understanding the concept of working independently on daily work. They did not view a mastery check as a criterion performance of content mastery but as simply a daily grade that they ordinarily could work collectively with their peers.

Second, students working on the traditional assignment treatment seemed to rely on fellow students to "think" for them if they encountered any problems. This tended to reduce the amount of time that each student spent trying to solve a problem independently or correcting their own mistakes.

Results:

For this investigation the standard t-test for dependent samples was used assuming equal variances across a group. Table 1 contains the data for the 10th grade class and Table 2 contains the data for the 11th grade class. The data in Table 1 and Table 2 included every score of every student involved in the investigation. The results of each t-test are included on each table. Variable 1 represents the test averages obtained during the traditional daily assignment treatment and variable 2 represents the test averages obtained during the five question mastery check treatment. Results were obtained by comparing the scores of students given the traditional assignment with the scores of the same students given the five question mastery check. As the results show, the findings were not statistically significant.

Discussion:

Looking at the actual data produced in this study, a small improvement was evident although the results were not statistically significant. Because the five question mastery check was a new concept to the students, the limited time of treatment application may have inhibited its positive effect. A longer study period could prove to have a greater effect. Application of the treatment in a more concentrated manner might produce results that are clearly defined. Also the mastery check treatment was applied during the last six weeks of the school year when students minds are most likely to be focused on non-academic subjects.

Some other items that should be considered in reviewing the results are differences in the groups. The 11th grade group, which experienced the most positive results, had math class after the morning break which allowed them time to release their nervous energy. The 10th grade group on the other hand had math sixth period, and sixth period comes at the end of the day when brains are tired and right before athletics period. Regarding the background of the two classes, there was a noticeable difference between the maturity level of the 11th graders and the lack of maturity of the 10th graders. This could serve to explain why the

treatment had a more positive effect in the 11th grade group.

In conclusion, the results from this investigation did not favor the five question mastery check as a means of assigning grade credit for learner performance, yet refinement of the treatment might alter the results.

Table 1: Test of Means
Tenth Grade Class

| | | Var1 | Var2 | t-ratio | d.f. | probability |
|---|---|---|---|---|---|---|
| Mean | = | 74.9 | 77.9 | -1.39 | 9 | .198 |
| Variance | = | 96.1 | 59.4 | | | |
| Standard deviation | = | 9.8 | 7.7 | | | |

Table 2: Test of Means
Eleventh Grade Class

| | | Var1 | Var2 | t-ratio | d.f. | probability |
|---|---|---|---|---|---|---|
| Mean | = | 86.4 | 90.1 | -2.10 | 7 | .072 |
| Variance | = | 34.3 | 33.8 | | | |
| Standard deviation | = | 5.8 | 5.8 | | | |

note: Var1 = traditional assignment scores
Var2 = five question mastery check scores

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